SUPERMARKET BILLING SYSTEM

DATA STRUCTURES PROJECT

By -

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Introduction

Automatic billing system, a useful concept and one of the most necessary systems required in today's world. Due to lots of items making their way in the market everyday it is a really helpful system for a shopkeeper to manage his products on one device and also useful for customers who generate their own bills themselves.
Our project is one such example where a shopkeeper can manage his store items at one place and can easily access anytime.Also a customer can generate his own bill with this project(code) we designed.

1. **Problem Statement -**
    - For a shopkeeper to remember each and every, small and big item is a hard task.
    - Also, to keep the record of sold items, remembering newly arrived items, and handling multiple customers at a time is sometimes troublesome.
    - At the same time instead of handling hundreds of items in a store it is better to track the record of all these items at a single place.
    - Our project is one such example where shopkeeper can store his items of the shop with their ID's and then when a customer arrives for shopping he can generate his own bill by entering the ID's marked on every items which are unique.

2. **How we approach the problem -**
    - To solve the problem of storing the items we created an array of ‘item names’ of size 1000.
    - The size of the amount is dependent on the store owner and can be changed or modified accordingly.
    - Here, we adopted the method of barcode by implementing arrays through mapping.
    - Then we created 2 menus where in one an admin(shopkeeper) can manage his record of items with their unique ID and can store or remove any of the items he wishes to.
    - In the second menu we gave four options to the customer where he can add items by it’s unique ID given by the shopkeeper. Also we used “delete”, “add”, “bill summary” functions
    - The main point about our approach in this problem was that we wrote a code whose time complexity is O(1) which is much optimized, similar to the currently used in the market and gives ease of handling different operations easily to the shopkeeper.

3. **Things we learned during this project -**
    - By doing this project we came to learn about real life implementation of a data structure i.e., arrays,stacks and queues.
    - How useful arrays can be if implemented in the right way and can store a lot of data.
    - Also we encountered several errors while writing this big code which helped us a lot in learning the mistakes we made while writing this code.
    - We also learned teamwork, making real life useful projects using data structures, how different data structures are used in these real world applications etc.

    - We implemented many data structures such as stack, queues etc. but none of which could give us the time complexity we achieved through this approach which we got through trial and error.

4. **Limitations of this project -**
    - One of the limitations of our project is that it cannot be applied(used) when a shopkeeper wants to store more than 10^7 items in his store.
    - For example, in today's era stores like D-MART have more than 10^7 quantities of items, and thus they can't use this project. This is due to the fact that arrays cannot store more than 10^7 items.
    - Thus a small or a semi wholesaler shopkeeper can use these project for storing items and provide their customers with automatic billing system which saves everyone's time and chances of mistakes in prices are negligible here while in manual calculation by a single man has more chances of errors.
    - Thus if the number of items increases such a limit, then it's a bit messy to handle these item records by our project as it uses arrays which have data storing limitations.